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EXAMINER

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ART UNIT	PAPER NUMBER
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1743

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7

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/887,257

Applicant(s)

ULKEM, I.

Examiner

T. TUNG

Group Art Unit

1743

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—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

## Status

- ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 1 1; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 1-14 is/are pending in the application.
- ☐ Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) 1-14 is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d):
  - ☐ All ☐ Some\* ☒ None of the CERTIFIED copies of the priority documents have been received.
  - ☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.
  - ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_
- ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other \_\_\_\_\_

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Claims 1-14 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The disclosure of the embodiment (claims 6-9, 13) wherein the gas reducer 17b is in the form of a fuel cell is inadequate. It is unclear how such a fuel cell is connected to the sensor. How is the sample gas connected to this fuel cell (i.e. as an oxidant or a fuel)? How is the sample gas from the fuel cell then connected to the sensor? And where is the supply of oxidant or fuel for the fuel cell? A mere black box 17b shown in figure 2 as the fuel cell gas reducer without any detailed explanation in the specification is not an adequate disclosure.

The catalyst set forth in claim 2 as "0.5-10 % Pd and/or Pt" is confusing. If the Pd is only up to 10%, what is the other component of the catalyst? In view of the "or", Pt would appear not to be the other component in combination with Pd. Also, it is unclear whether Pt is acting by itself as the sole catalyst material or in combination with some other component. If the latter, what is that other component? And, what concentration is the Pt component?

Claim 10, line 5 calls for a membrane to be made of "PFA". What is the material for which this acronym stand? Also, "PFA" is inconsistent with the specification at page 7, last paragraph, which discloses "PP" instead. This contradiction needs to be resolved.

The embodiment wherein the protective membrane covering the counter electrode can be made of an oxygen ion/electronic mixed-conducting ceramic (claim 10) is questioned for its

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suitability. It is common knowledge and admitted by applicant at page 8, second full paragraph, of the specification, that such a ceramic passes oxygen only at elevated temperatures (e.g. 700 C). How, then, can such a ceramic be used in combination with an aqueous acidic electrolyte, which would be boiled off at the operative temperatures of the ceramic? Even if a non-aqueous electrolyte were used, what would prevent other components of the sensor such as the PTFE membrane covering the working electrode (claim 10) from being destroyed by the high temperature?

Further, the specification at page 7, line 10 sets forth an electrolyte "gel" in the form of an acidic electrolyte disposed within a porous solid support such as a glass frit. It is unclear how a gel is formed in this manner. The glass frit would appear to be nothing more than a matrix that supports the acidic electrolyte and would not form a gel therewith. A gelling or thickening agent is needed for forming a gel.

Claims 1-10, 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The improper "s" form (e.g. claim 1, line 1, "oxidisable") should be changed throughout the specification and claims to the "z" form.

Claim 1, line 6, --of-- should be added after "amount" to make the language read correctly.

Claim 2, line 3, "0.5-10 % Pd and/or Pt" is indefinite, as discussed before.

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Claims, 4, 5, 8, 9 and 10, line 4, the "or" after the comma appears to be superfluous.

Claims 4, 5, 8, 9, line 3 and claim 10, line 4, --a-- should be added before "dense".

Claim 6, line 6, --of-- should be added after "amount".

Claim 10, line 7, --an-- should be added before "oxygen". Line 8, "membranes" should be singularized. Line 10, "i.e...." is indefinite, since it is unclear if the composition is being claimed or not.

Claim 14, lines 3-4, "known as Moleculite" should be deleted, since Moleculite appears to be a trademark.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Neti et al 4,051,006.

Neti discloses a sensor comprising a working electrode 26 and a counter electrode 28 protected respectively by Gortex (a PTFE material) membranes 18 and 20. A catalyst layer 47 comprising Pd on carbon is located between the counter electrode and the ambient. See figures 1 and 3; col. 3, line 20 to col. 4, line 51. The catalyst layer 47 is considered to meet applicant's language "catalyst disk" (claim 1, line 3), since no particular thickness is specified.

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neti et al.

Claim 2 differs by calling for the Pd catalyst to be of a certain percentage, while claim 12 differs by calling for the catalyst layer to be between the counter electrode and its protection membrane.

The percentage of the Pd in the catalyst is a matter of routine choice in the absence of unexpected result. As for claim 12, locating the catalyst on the inside of the protection membrane would have been obvious because that would permit the catalyst to be protected by the protection membrane.

Claims 3, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neti et al in view of Maki et al 6,165,336 and/or Moskovitz et al 5,955,393.

These claims differ by calling for the catalyst to comprise transition metal oxides such as a mixture of CuO and MnO<sub>2</sub>.

Maki discloses a catalyst layer 20 of a noble metal such as Pd or a mixture of transition metal oxides located between an electrode 8 and a protection membrane 2. See col. 12, lines 55-61; col. 25, lines 28-46. Moskovitz discloses a catalyst of a CuO/MnO<sub>2</sub> to be well-known. See col. 32, lines 10-51 and Table 6. It would have been obvious for Neti to adopt the transition

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metal oxide catalyst of the secondary references, since Maki teaches such catalysts to be equivalent to a noble metal catalyst (Pd).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Neti etal in view of Glover 3,088,905 or Breuer etal 4,141,800.

This claim differs by calling for the working electrode protection membrane to have a thickness of 5 to 50 microns.

Glover discloses a PTFE protection membrane with a thickness of 0.5 mil, which is about 12 microns. See col. 2, line 40. Breuer discloses a PTFE membrane 16 with a thickness of 5 to 7.5 microns. See col. 6, lines 18-20. It would have been obvious for Neti to adopt the membrane thickness of Glover or Breuer, since the incorporation of known features from analogous prior art is within the skill of the art in the absence of unexpected result.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Neti etal in view of Scott etal 3,997,419.

This claim differs by calling for the counter electrode protection membrane to have a thickness of 20-100 microns.

Scott discloses a protection membrane with a thickness of 2 mils, which is about 50 microns. See co. 4, lines 11-14. It would have been obvious for Neti to adopt the membrane thickness of Scott, since the incorporation of known features from analogous prior art is within the skill of the art in the absence of unexpected result.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who

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has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-3, 11, 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Maki et al.

Maki discloses a sensor comprising a working electrode and a counter electrode with a protection layer 2 covering each electrode. A catalyst layer 20 is located between the counter electrode and its protection layer. The catalyst can be of a noble metal such as Pd or a mixture of transition metal oxides. See col. 12, lines 55-61; figures 11 and 15; col. 25, lines 28-46; col. 27, lines 11-58.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maki et al in view of Moskovitz et al.

This claim differs by calling for the transition metal oxides to be CuO/MnO<sub>2</sub>.

Moskovitz, as discussed before, discloses CuO/MnO<sub>2</sub> to be a conventional catalyst. See col. 32, lines 10-51; Table 6. It would have been obvious for Maki to adopt CuO/MnO<sub>2</sub> as its catalyst in view of Moskovitz, since the incorporation of known features is within the skill of the art in the absence of unexpected result.

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 6, 7 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Grot et al 6,001,499.

Grot discloses a sensor 40 with a working electrode and a counter electrode connected to a fuel cell 2. See col. 6, line 62 to col. 8, line 38. In as much as it is unclear just how applicant



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connects his fuel cell to the sensor, his claims are deemed to describe at best an obvious variant of the patent's system.

Claims 8, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grot et al in view of Neti et al or Maki et al.

It is not evident if Grot's sensor has protection membranes for the electrodes. For the purpose of this rejection, it is presumed that no such membranes are disclosed by Grot.

As discussed before, Neti (figure 1) or Maki (figures 11, 15) discloses a protection membrane for each of its electrodes. It would have been obvious for Grot to adopt a protection membrane for each of its electrodes, so as to prevent contaminants from reaching the electrodes.

Luck 3,878,080 discloses polypropylene as a suitable protection membrane material for a gas sensor. See col. 4, line 8. Rupich discloses Gortex to be a PTFE material. See col. 4, line 2. Joshi et al 6,051,123 discloses a diffusion membrane 126 made of a ceramic material. See col. 10, lines 5-12.

The examiner can be reached at 703-308-3329. His supervisor Jill Warden can be reached at 703-308-4037. Any general inquiry should be directed to the receptionst at 703-308-0661. A fax number for TC 1700 is 703-872-9310.

  
Ta Tung

Primary Examiner

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